



## HOMEOWNER TIPS

*Mosquitoes* are found breeding in many different backyard habitats. Follow these tips to limit the number of mosquitoes breeding in your own backyard and break the breeding cycle!

- Store containers upside down or get rid of old tires, cans, pails, and other water-holding containers
- Fill in or drain low spots in your yard
- Keep ditches, drains, and culverts clear of weeds and trash
- Drain water from tarps that cover wood piles, boats, etc.
- Keep eaves clean of leaves and debris
- Empty plastic wading pools at least once a week or store indoors when not in use
- Change bird bath water weekly
- Keep grass cut short and shrubbery well-trimmed so adult mosquitoes will not rest there in the daytime
- Use a fine-mesh screen on top of rain barrels so female adults cannot reach the water surface to lay eggs



Light Trap



# BAY COUNTY Mosquito CONTROL

## Mosquito Life Cycle

### Mosquito Annoyance

Health concerns are not the only reason to control mosquitoes. Mosquito annoyance can be enough to make outdoor activities such as boating, barbecuing, picnics, and ball games unpleasant. Bay County Mosquito Control strives to improve the quality of life in the area for both residents and tourists.

While mosquitoes can never be completely eliminated, Mosquito Control strives to effectively control them by reducing populations to more tolerable levels. If you are confronted with mosquitoes, it is best to apply insect repellent to exposed skin. Remember to follow manufacturer's directions and avoid known breeding grounds during early morning and evening hours, when mosquitoes are most active. Reducing exposure to adult mosquitoes also reduces the potential for disease infection.



### Education

Visual presentations are given to various groups, including elementary and middle school classrooms, civic groups, scouts, and community service groups among others.

The focus for school classrooms involves life cycles, surveillance tools, habitats where mosquito larvae are found, homeowner tips, and showing students live mosquitoes so they are aware what to look for. We also try to bring in other live insects that dwell in pond habitats alongside mosquitoes.

For more information, call 989-894-4555 or visit our website at [www.baycounty-mi.gov/MosquitoControl](http://www.baycounty-mi.gov/MosquitoControl).



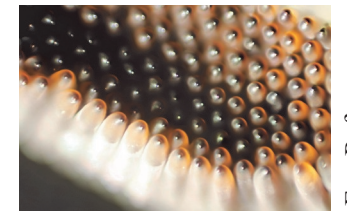
### BIOLOGICAL SURVEILLANCE

Mosquito Control uses several collection methods to determine the abundance, location, and species of both immature stages and adult mosquitoes before any insecticides are applied. There are about 30 different kinds of mosquitoes in Bay County. Some are disease vectors, while others are just nuisance species.

Larvae are monitored by using a tool called a dipper, while adults are captured in a variety of mechanical traps: New Jersey Light Traps, CDC Traps (carbon dioxide-baited), and Gravid Traps.

Mosquitoes undergo four stages of development: egg, larva, pupa, and adult. Eggs are laid in any place where standing water accumulates after rain or flooding. Once eggs hatch, larvae emerge and undergo four larval stages or instars before they change into pupae. Pupae do not feed and are often found at the surface of water (like larvae) where they can breathe. Larvae and pupae develop in the water habitat for about five days in the summer when water temperatures are warm. Inside the pupa's protective shell, the mosquito transforms into the winged adult.

Female adult mosquitoes bite a variety of hosts—people, horses, dogs, cattle, and birds. Only the female mosquito bites because she needs blood to produce eggs. Some mosquitoes may fly from 1/2 to 20 miles from their breeding site! Mosquitoes develop from egg to adult in 7-10 days; adult mosquitoes can live as long as a month during the summer.



Egg Raft



Larva/Pupa



Adult

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## LARVAL CONTROL

Bay County Mosquito Control manages mosquitoes using an Integrated Mosquito Management (IMM) approach, which means that we use a combination of techniques to control mosquitoes such as dumping containers, using microbial or chemical control methods, and education.

Although efforts are geared toward limiting habitat available to mosquitoes (source reduction), it is sometimes necessary to manage mosquitoes in other ways. Larviciding is the term used to describe controlling mosquitoes while they are still young, or in the larval or pupal stage of development. Virtually any natural or man-made collection of standing water can support mosquito development. Technicians inspect a wide variety of habitats, including ponds, flooded woodlots, flooded fields, drains, ditches, catch basins, containers, neglected swimming pools, etc. Depending on rainfall, water temperature, organic content of the water, and a variety of other factors, technicians may repeat applications at a particular site several times over the course of the summer. Nearly 70% of our time is spent larviciding, with over 15,000 breeding sites inspected annually. Approximately 17% require treatment.



## Source Reduction

Source reduction is the physical or permanent removal of mosquito breeding sources from the environment. It can be as simple as dumping water from containers or as complex as installing a catch basin drain in a field to prevent standing water from developing. Much of our time is spent walking through neighborhoods and backyards looking for and eliminating these small, but nevertheless effective breeding habitats.

Source reduction also includes collecting illegally dumped scrap tires or those from residents' backyards. Two scrap tire drives are held annually where homeowners can recycle tires-up to 10 rimless car or pickup tires per residence. This eliminates tires as a breeding source and reduces the need for insecticides to be used. Tires are recycled so they will not end up in a landfill. Tires are ground into chips and shipped to Michigan power plants to be burned as tire-derived fuel, helping to create enough energy for 2,300 homes per day.

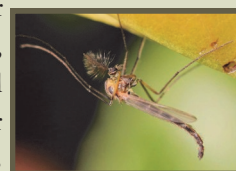


*During a scrap tire drive, Bay County residents bring in old car and truck tires for recycling.*

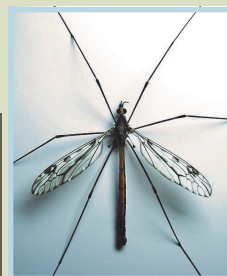
## Similar Insects

Mosquitoes are small, long-legged, two-winged insects belonging to the order Diptera and the family Culicidae. The adults differ from other flies in that they have both an elongated proboscis (mouthpart) and scales on the wing veins and wing margins.

Insects commonly confused with mosquitoes include crane flies and midges. Crane flies don't usually have a proboscis, have very long legs, a long, thin abdomen and do not bite. They look like "giant" mosquitoes. Midges, which don't bite, can be annoying because they often occur in large swarms. Midges are short-lived, but these tips may help minimize their annoyance: shut doors, tightly screen windows and change to yellow outdoor lights that are less attractive to these insects.



*Midge*



*Crane Fly*

## Important Mosquito-Borne Diseases in Michigan

1

**West Nile Encephalitis**

2

**Eastern Equine Encephalitis**

3

**St. Louis Encephalitis**

4

**California Encephalitis**

5

**Dog Heartworm**

## Adulticiding

Adulticiding is an aerosol application of insecticide designed to control adult mosquitoes in flight. Materials are applied in very small amounts (about 1-2 ounces of active ingredient per acre) using Ultra Low Volume (ULV) equipment. Control materials used do not persist in the environment and are quickly broken down in sunlight.

Mosquito fogging is performed by technicians certified by the State of Michigan in pesticide laws and regulations. Applications are conducted at night when target mosquitoes are most active. Products used to control both adult and immature mosquitoes are applied in strict conformance with label requirements.

Truck-mounted spray units are sent to areas where there is evidence of high mosquito

populations. Spraying ceases, however, when winds are too strong or when air temperatures are too low, which causes mosquito activity to drop.



*A truck-mounted ULV machine fogging to control adult mosquitoes.*



## DISEASE CONCERNS

The following serious mosquito-borne diseases may be transmitted to humans by mosquitoes found in Bay County: West Nile Encephalitis, Eastern Equine Encephalitis, St. Louis Encephalitis, and LaCrosse Encephalitis. Many mosquito-transmitted viruses live in nature in a bird-mosquito cycle with mosquitoes feeding on infected birds, and in turn infecting other birds. At times, these infected mosquitoes feed on other animals such as humans and that is when human cases occur. Dead birds can be indicators of whether mosquito-borne disease is present in an area. If you see a dead bird between the months of April and October, please help our surveillance program by reporting the bird to our office. We collect and test crows and blue jays that have been dead less than 24 hours and show no signs of decomposition.

Canine heartworm is also transmitted by mosquitoes to dogs. The worms live in the heart and can severely weaken or kill the dog. Veterinarians can prescribe preventative medication.

